

## C L A I M S

1. An unascertained water occurrence  
2 distribution estimating device characterized by  
3 comprising unascertained water occurrence distribution  
4 estimating means for outputting an unascertained water  
5 occurrence distribution in each district, in which an  
6 occurrence distribution of unascertained water flowing  
7 into a sewer is to be estimated, on the basis of a  
8 comparison result between unascertained water occurrence  
9 function information in said each district and  
10 unascertained water amount function information at a  
11 base point located downstream of said each district,  
12 said unascertained water occurrence distribution  
13 estimating means including first processing means for  
14 performing a pattern matching analysis between  
15 unascertained water occurrence function information in  
16 said each district, which is generated from  
17 unascertained water occurrence factor information in a  
18 district of interest which includes an amount of  
19 rainfall in the district of interest, and the  
20 unascertained water amount function information  
21 including an amount of unascertained water at the base  
22 point, and second processing means for outputting a  
23 pattern matching degree for said each district which is  
24 obtained by the pattern matching analysis as an  
25 unascertained water occurrence distribution in said each  
26 district.

2. An unascertained water occurrence  
distribution estimating device according to claim 1,  
characterized in that the unascertained water occurrence  
function information includes rainfall amount data  
representing a time-series change in an amount of  
rainfall in a district of interest, and the  
unascertained water occurrence amount function  
information includes unascertained water amount data  
representing a time-series change in an amount of  
unascertained water at the base point.

3. An unascertained water occurrence  
distribution estimating device according to claim 2,  
characterized in that the pattern matching degree  
comprises a correlation value between the rainfall  
amount data and the unascertained water amount data.

4. An unascertained water occurrence  
distribution estimating device according to claim 3,  
characterized in that said first processing means  
calculates the correlation value by correcting a  
difference in time required for unascertained water to  
reach the base point from the district of interest.

5. An unascertained water occurrence  
distribution estimating device according to claim 3,  
characterized in that said first processing means  
calculates correlation values while sequentially  
shifting temporal positions of the rainfall amount data  
and unascertained water amount data, and selects a

7 maximum value of the correlation values as a correlation  
8 value in the district of interest.

6. An unascertained water occurrence  
2 distribution estimating device according to claim 3,  
3 characterized by further comprising unascertained water  
4 calculating means for calculating the unascertained  
5 water amount data from a difference between sewage water  
6 amount data representing a time-series change in an  
7 amount of sewage water at the base point and  
8 non-rainfall sewage water amount data representing a  
9 time-series change in an amount of sewage water at the  
10 base point in a non-rainfall weather.

7. An unascertained water occurrence  
2 distribution estimating device according to claim 1,  
3 characterized by further comprising contour information  
4 calculating means for calculating a pattern matching  
5 degree around said each district by performing  
6 interpolation computation using a pattern matching  
7 degree in said each district as interpolation  
8 information, and outputting contour information  
9 representing the unascertained water occurrence  
10 distribution by using the obtained interpolation  
11 information.

8. An unascertained water occurrence  
2 distribution estimating method characterized by  
3 comprising the unascertained water occurrence  
4 distribution estimating step of outputting an

5 unascertained water occurrence distribution in each  
6 district, in which an occurrence distribution of  
7 unascertained water flowing into a sewer is to be  
8 estimated, on the basis of a comparison result between  
9 unascertained water occurrence function information in  
10 said each district and unascertained water amount  
11 function information at a base point located downstream  
12 of said each district,  
13               the unascertained water occurrence  
14 distribution estimating step including the first step of  
15 performing a pattern matching analysis between  
16 unascertained water occurrence function information in  
17 said each district, which is generated from  
18 unascertained water occurrence factor information in a  
19 district of interest which includes an amount of  
20 rainfall in the district of interest, and the  
21 unascertained water amount function information  
22 including an amount of unascertained water at the base  
23 point, and the second step of outputting a pattern  
24 matching degree for said each district which is obtained  
25 by the pattern matching analysis as an unascertained  
26 water occurrence distribution in said each district.

9. An unascertained water occurrence  
2 distribution estimating method according to claim 8,  
3 characterized in that the unascertained water occurrence  
4 function information includes rainfall amount data  
5 representing a time-series change in an amount of

6 rainfall in a district of interest, and the  
7 unascertained water occurrence amount function  
8 information includes unascertained water amount data  
9 representing a time-series change in an amount of  
10 unascertained water at the base point.

10. An unascertained water occurrence  
2 distribution estimating method according to claim 9,  
3 characterized in that in the first step, as the pattern  
4 matching degree, a correlation value between the  
5 rainfall amount data and the unascertained water amount  
6 data is used.

11. An unascertained water occurrence  
2 distribution estimating method according to claim 10,  
3 characterized in that in the first step, the correlation  
4 value is calculated by correcting a difference in time  
5 required for unascertained water to reach the base point  
6 from the district of interest.

12. An unascertained water occurrence  
2 distribution estimating method according to claim 10,  
3 characterized in that in the first step, correlation  
4 values are calculated while temporal positions of the  
5 rainfall amount data and unascertained water amount data  
6 are sequentially shifted, and a maximum value of the  
7 correlation values is selected as a correlation value in  
8 the district of interest.

13. An unascertained water occurrence  
2 distribution estimating method according to claim 10,

3 characterized by further comprising the third step of  
4 calculating the unascertained water amount data from a  
5 difference between sewage water amount data representing  
6 a time-series change in an amount of sewage water at the  
7 base point and non-rainfall sewage water amount data  
8 representing a time-series change in an amount of sewage  
9 water at the base point in a non-rainfall weather.

14. An unascertained water occurrence  
2 distribution estimating method according to claim 8,  
3 characterized by further comprising the fourth step of  
4 calculating a pattern matching degree around said each  
5 district by performing interpolation computation using a  
6 pattern matching degree in said each district as  
7 interpolation information, and outputting contour  
8 information representing the unascertained water  
9 occurrence distribution by using the obtained  
10 interpolation information.

15. A recording medium characterized by  
2 recording a program for causing a computer for an  
3 unascertained water occurrence distribution estimating  
4 device, which outputs an unascertained water occurrence  
5 distribution in each district, in which an occurrence  
6 distribution of unascertained water flowing into a sewer  
7 is to be estimated, on the basis of a comparison result  
8 between unascertained water occurrence function  
9 information in said each district and unascertained  
10 water amount function information at a base point

11 located downstream of said each district, to execute  
12 the first step of performing a pattern  
13 matching analysis between unascertained water occurrence  
14 function information in said each district, which is  
15 generated from unascertained water occurrence factor  
16 information in a district of interest which includes an  
17 amount of rainfall in the district of interest, and the  
18 unascertained water amount function information  
19 including an amount of unascertained water at the base  
20 point, and the second step of outputting a pattern  
21 matching degree for said each district which is obtained  
22 by the pattern matching analysis as an unascertained  
23 water occurrence distribution in said each district.

16. A recording medium according to claim 15,  
2 characterized in that the program makes the  
3 unascertained water occurrence function information  
4 include rainfall amount data representing a time-series  
5 change in an amount of rainfall in a district of  
6 interest, and makes the unascertained water occurrence  
7 amount function information include unascertained water  
8 amount data representing a time-series change in an  
9 amount of unascertained water at the base point.

17. A recording medium according to claim 16,  
2 characterized in that the program uses a correlation  
3 value between the rainfall amount data and the  
4 unascertained water amount data as the pattern matching  
5 degree in the first step.

18. A recording medium according to claim 17,  
2 characterized in that the program calculates the  
3 correlation value by correcting a difference in time  
4 required for unascertained water to reach the base point  
5 from the district of interest in the first step.

19. A recording medium according to claim 17,  
2 characterized in that the program calculates correlation  
3 values while sequentially shifting temporal positions of  
4 the rainfall amount data and unascertained water amount  
5 data, and selects a maximum value of the correlation  
6 values as a correlation value in the district of  
7 interest in the first step.

20. A recording medium according to claim 17,  
2 characterized in that the program further comprises the  
3 third step of calculating the unascertained water amount  
4 data from a difference between sewage water amount data  
5 representing a time-series change in an amount of sewage  
6 water at the base point and non-rainfall sewage water  
7 amount data representing a time-series change in an  
8 amount of sewage water at the base point in a  
9 non-rainfall weather.

21. A recording medium according to claim 15,  
2 characterized in that the program further comprises the  
3 fourth step of calculating a pattern matching degree  
4 around said each district by performing interpolation  
5 computation using a pattern matching degree in said each  
6 district as interpolation information, and outputting



- 7 contour information representing the unascertained water
- 8 occurrence distribution by using the obtained
- 9 interpolation information.